BUYER'S GUIDE: X Terminals X-plore New Territory *page 108*

A CAHNERS PUBLICATION

DATAMATION®

FOR CORPORATE COMPUTING PROFESSIONALS WORLDWIDE

SEPTEMBER 15, 1992

William E. Foster, president & CEO, Stratus Computer Inc., unveils the X/AR series

Stratus Spreads RISC Bet

page 28

What PC Managers Say About Client/Server
page 54

Novell Bids To Buoy Storage Management
page 63

Low-Cost Mainframe Storage For LANs
page 73

Go Totally RAD And Build Apps Faster
page 79

Print (Almost) Anything Anywhere
page 83

SOFTWARE BIG 50
page 40

DATAMATION
FOR CORPORATE COMPUTING PROFESSIONALS WORLDWIDE

FEATURES

COVER STORY

28 Stratus Spreads RISC Bet

Stratus lowers the cost of fault tolerance with a newly powerful X/AR line, now shipping. But some question its strategy in light of plans for a future generation.

SPECIAL REPORT

40 Software's Big 50: The Magic Is Stronger

Costs skyrocketing? Inventories out of control? Marketing a shambles? "Shazaam," say software vendors, and it's all transformed.

50 Software's Big 50: The Sorcerer's Apprentices

Where will software technology be in the next five years or so? Look no further than these and other up and comers.

PRODUCT GUIDE

105 Chart Your App's Performance

Rooting out and eradicating hidden applications inefficiencies is the mission of Programart Corp.'s new APMpower analysis package.

106 A RAID On UNIX

ECCS Inc. has introduced two RAID subsystems, providing level 1 and level 5 data protection.

BUYER'S GUIDE

108 X Terminals X-Plore New Territory

As workstation stand-ins and ASCII terminal replacements, X terminals compete on cost and features.

PCs & WORKSTATIONS

54 What PC Managers Say About Client/Server

DATAMATION gathered eight top managers for a two-hour session on the future of client/server systems and "rightsizing."

Continued on page 5

ON THE COVER: Stratus's Foster is atop the fault tolerant line, page 28.

SPECIAL REPORT: Revenues top 15 billion for North America's 50 largest software vendors, page 40.

PRODUCT GUIDE: Programart's Hart Riordan believes developers should be held accountable for their code, page 105.

CONTENTS

FEATURES

NETWORKS

63 Novell Bids To Buoy Storage Management

Storage Management Services, a path toward automated LAN backup, gets high marks but much grumbling about delays.

73 Low-Cost Mainframe Storage For LANs

Two little-known software products let NetWare LANs access IBM mainframe storage across networks.

SOFTWARE

79 Go Totally RAD And Build Apps Faster

"Want to see me write a new application with RAD?" (blink) "Want to see another one?" Believe it—RAD can blow away your backlogs.

PERIPHERALS

83 Print (Almost) Anything Anywhere

New products are moving networks closer to the goal of routing any document from any platform to any printer.

89 PostScript Printing Gets A Boost

New black-and-white and color printers from Xerox accelerate LAN printing and boost power.

MIDRANGE/MAINFRAME

93 Channeling The Flood Of Stored Corporate Data

Sure, you can add disk drives to your overloaded net. But that's expensive. Another option: integrated storage servers.

MANAGEMENT

98 Cultivating The Smooth Operator

The data center operator's job doesn't have to be boring. Some managers have found that interested operators are smooth operators.

DEPARTMENTS

Inside 9	Career Opportunities . . 118
Letters 12	Economic Trends 125
Look Ahead 19	Ad Index 126
Media Report 23	Corporate Software
New Products 113	Scorecard 127
Future Vision 128	

COMPANY INDEX

This index lists vendors, user groups and industry associations mentioned in this issue of DATAMATION, excluding those in the Buyer's Guide, the Software Scorecard and those mentioned only in passing. Page numbers refer to the first page of articles.

Addtech 113
Adobe 40, 83, 89
Advantis 19
Aldus 40
Always Technology 113
Amdahl 19, 93
American Software 40
AMS 40
Andersen Consulting 28, 40, 79
Apple 19, 89
Archive 63
Ares 113
ASK 40
Attachmate 40
Autodesk 40
Bachman 40, 79
Barr Systems 83
BBN 40
Beaver 113
BIS Strategic Decisions 83, 89
BMC 40
Boole & Babbage 40
Borland 19, 40
BRG 40, 63
CA 40
Cadence 40
Cadre 113
Candle 40
Canron 79
Carolina Power 118
CGI-Informatique 40
Cheyenne 63
Cigna 79
Cincom 40
Citicorp 79
Cognos 40
Compaq 19
CompuServe 40
Computervision 93
Compuware 40
Comshare 40
Continuum 40
Control Data 93
Convex 93
D&B Software 40
DataEase 19
Datapoint 113
Dataquest 40
Dean Witter 54
DEC 19, 28, 40, 93, 113
Depository Trust 54
Develcon 113
DG 40, 93, 113
EMC 93
Emerald Systems 63
Emeritus 63
Epoch 93
Epson 113
Ernst & Young 40
FIND/SVP 19
Finsiel 40
Gartner Group 83
General Atomics 93
Gillette 28
Goal 40
GTE Products 93
Hayes 113
HBO 40
HP 19, 28, 40, 83, 89, 93, 105
IBI 113
IBM 19, 28, 40, 63, 73, 83, 93, 113, 118
ICL 118
IDC 28
Information Builders 40
Informix 28, 40
Integrated Network 113
Integrix 113
Intel 19, 28, 63, 113
Interface 83
Interleaf 40
J.D. Edwards 40
John Fluke 93
Knowledgeware 40, 79
Kodak 89
Legato Systems 63, 93
Legent 40
Level II 28
Logica 40
Lotus 19, 40, 98
MapInfo 113
Marin Research 113
Maxoptic 113
Maynard Electronics 63
Mentor Graphics 40
Merrill Lynch 54
Micro Focus 40
Microsoft 19, 40, 63
Motorola 19, 113
MPI Technologies 83
NCH 73
NCR 19, 113
Network Software Associates 113
NeXT 40
Novell 19, 28, 40, 63, 73
Okidata 105
OPsTECH 98
Oracle 19, 28, 40
OSF 28, 83
Palindrome 63
ParaTechnology 113
Peat Marwick 54
Pennant Systems 83
Peripheral Strategies 63
Phaser Systems 73
Phelps Dodge 40
Phillips Petroleum 63
Phoenix Network Technologies 19
Policy Management 40
Post Software 118
Preferred Systems 113
Prime 93
Programart 105
Project Software & Development 113
Provident 54
Proxima 113
QMS 83
Racal 126
Robert Half 118
SAP 40
SAS 40
Scientific Software 28
SCO 40
Sears 19
Sema Group 40
Sherpa 113
Siemens Medical Systems 54
Silicon Graphics 93
SmartStar 79
Software AG 40
Software One 19
Software Publishing 40
Spectrum Concepts 40
Standish Group 28
Sterling Software 40
StorageTek 93
Stratus 19, 28
SunPics 83
Sybase 28, 40
Symantec 40
Systems Center 19, 40
System Software Associates 40
Sytron 63
Tandem 28, 93
Tektronix 113
Transaction Processing Performance Council 28
Unisys 93, 113
VideoServer 113
WordPerfect 40
Xerox 83, 89
XPLOR 83
Zurich-American Ins. 73

SOFTWARE'S BIG 50:

THE MAGIC IS STRONGER

Costs skyrocketing? Marketing a shambles? "Shazaam" say software vendors, and it's all transformed.

It's the 1990s, and software is everything. How else to explain it?

Explain how, in the midst of one of the most crushing world economic downturns in years, sales by North America's 50 largest independent software vendors could have surged to $15.2 billion, up almost 14% from last year's list, and over 21% compared with their own 1990 performance.

What is this magic that lets the software industry consistently transform a few billion bits and bytes, an artfully crafted series of ones and zeros, into billions in hard gold, recession be damned?

The answer lies in that word "transform". Like medieval kings and barons, today's business leaders are on a quest for the right magical mix of elements to transform their problems into profits, to reengineer the way they do business so they can spend less and sell more. And they're turning to their corporate alchemists to make it happen.

(Continued on page 42)

BY MIKE RICCIUTI

THE DATAMATION SOFTWARE BIG 50

The top 50 North American independent software companies.

RANK 1991	RANK 1990	COMPANY	1991 REVENUE	1990 REVENUE	% CHANGE	1ST Q'92 REVENUE	1991 R&D	NET INCOME	1991 EMPLOYEES
1	1	**Microsoft Corp.**	2,275.9	1,480.0*	53.8%	680.9	290.2	581.4	10,000
2	2	**Computer Associates International Inc.**	1,437.8	1,310.7	9.7%	469.9	183.5	173.0	7,700
3	3	**Oracle Corp.**	1,085.0	1,002.0*	8.3%	290.0	141.0	76.0	7,786
4	4	Lotus Development Corp.	828.9	692.2*	19.7%	227.1	116.6	43.1	4,324
5	6	**Novell Inc. ^^**	710.4	526.3*	35.0%	205.0	77.9	104.2	2,843
6	5	D & B Software Services Inc.	548.7	539.0*	1.8%	N/A	N/A	N/A	4,460
7	7	**WordPerfect Corp. +**	532.5	452.4	17.7%	N/A	N/A	N/A	2,896
8	24	Borland International Inc.	501.6	418.4*	19.9%	116.8	61.0	-80.7	2,000
9	8	**Mentor Graphics Corp.**	400.1	435.2	-8.1%	100.1	79.5	-61.6	2,438
10	13	Ask Computer Systems Inc.	394.6	249.7	58.0%	112.1	32.9	57.6	2,233
11	18	**Cadence Design Systems Inc.**	353.0	322.0*	9.6%	101.4	68.0	22.0	2,300
12	10	Policy Management Systems Corp.	342.0	272.0*	25.7%	N/A	68.0	47.6	4,403
13	14	**SAS Institute Inc. +**	295.1	240.2	22.9%	N/A	N/A	N/A	N/A
14	12	American Management Systems Inc.	285.2	261.9	8.9%	75.6	16.6	11.6	3,120
15	16	**Autodesk Inc.^**	284.9	237.9	19.8%	75.4	34.8	57.8	1,272
16	15	CompuServe Inc.	251.6	238.9	5.3%	N/A	N/A	N/A	1,625
17	26	**Adobe Systems Inc.^^**	229.7	168.7	36.2%	62.6	33.2	51.6	708
18	21	Sterling Software Inc.	228.9	207.0	10.6%	17.4	10.1	13.0	2,000
19	40	**Symantec Corp.**	210.1	124.3*	69.0%	67.4	29.3	21.5	790
20	25	Legent Corp.	207.8	180.5*	15.1%	66.0	18.8	36.2	1,150
21	22	**Bolt Beranek and Newman Inc.**	206.6	204.3	1.1%	N/A	32.5	6.6	2,200
22	23	Information Builders Inc. +	202.3	191.0*	5.9%	N/A	30.0	N/A	1,500
23	30	**Informix Software Inc.**	179.8	146.1	23.1%	59.1	N/A	12.6	941
24	31	Compuware Inc.+	175.0	141.8*	23.4%	N/A	N/A	N/A	1,379
25	37	**BMC Software Inc.**	174.0	117.0	48.7%	56.0	43.0	42.0	738
26	29	Candle Corp. +	169.0	151.4	11.6%	N/A	49.8	N/A	1,000
27	32	**Aldus Corp.**	167.5	135.0	24.1%	44.1	23.4	23.8	952
28	33	System Software Associates Inc.**	161.9	121.0	33.8%	49.7	N/A	16.4	800
29	—	**Sybase Inc.**	159.4	103.1	54.6%	47.9	27.2	9.2	1,065
30	20	Cincom Systems Inc. +	158.0	153.2*	3.1%	N/A	N/A	N/A	1,383
31	28	**Software Publishing Corp.**	141.3	153.5	-7.9%	43.4	30.7	-20.4	721
32	35	The Santa Cruz Operation Inc. +	137.6	118.9	15.7%	N/A	N/A	N/A	1,196
33	—	**The Continuum Co. Inc.****	128.8	97.1	32.6%	N/A	N/A	N/A	1,100
34	36	Goal Systems International Inc. ^	128.0	108.0*	18.5%	30.9	15.2	8.2	900
35	34	**Cognos Inc. ^^**	126.4	115.3	9.6%	32.8	15.3	4.1	1,023
36	44	KnowledgeWare Inc.**	125.3	66.2	89.3%	26.8	14.1	6.2	775
37	38	**Comshare Inc.**	124.1	116.0	7.0%	29.7	21.8	4.4	1,125
38	48	J.D. Edwards & Co. +	123.1	72.1*	70.7%	34.6	4.5	2.6	934
39	39	**Systems Center Inc.**	123.0	95.0*	29.5%	31.0	20.0	4.0	939
40	42	American Software Inc.	114.0	99.1	15.0%	28.0	12.1	20.4	900
41	41	**Boole & Babbage Inc.**	101.0	99.1	1.9%	26.9	20.5	-10.4	640
42	46	Interleaf Inc.	94.0	84.1	11.8%	29.4	17.8	3.9	820
43	49	**Attachmate Corp.** +**	91.0	77.2*	17.9%	22.0	N/A	N/A	594
44	—	**UNIX Systems Laboratories Inc.** +**	77.0	70.0	10.0%	20.0	56.0	N/A	650
45	—	**Central Point Software Inc. +**	74.8	48.7	53.6%	20.0	4.0	-1.0	310
46	—	**Intersolv Inc.**	70.0	70.0	0.0%	23.0	11.0	5.0	550
47	—	**Banyan Systems Inc.**	69.8	54.6	27.8%	21.0	13.0	3.0	633
48	—	**Ross Systems Inc.**	69.5	52.1	33.4%	18.0	11.0	2.0	620
49	—	**Software Engineering of America Inc. +**	67.0	61.0	9.8%	N/A	N/A	N/A	250
50	—	**Information Resources Inc.**	65.8	51.4	28.0%	17.0	N/A	N/A	528
		TOTAL	**15,206.8**	**12,532.6**	**21.4%**				**91,214**

THE DATAMATION EUROPEAN BIG 10

RANK 1991	COMPANY	1991 REVENUE	1990 REVENUE	% CHANGE	1ST Q'92 REVENUE	1991 R&D	NET INCOME	1991 EMPLOYEES
1	**Finsiel SpA**	1,015.6	816.7	24.4%	N/A	40.2	23.8	7,328
2	**Sema Group**	640.5	533.4	20.1%	N/A	24.7	18.7	6,850
3	**Software AG+**	429.2	361.4	18.8%	N/A	107.3	N/A	4,000
4	**SAP AG**	426.2	308.8	38.0%	N/A	103.7	74.3	2,685
5	**Logica PLC**	348.9	338.9	3.0%	N/A	8.8	-1.7	3,592
6	**CGI-Informatique**	315.6	289.1	9.2%	N/A	10.8	29.7	3,750
7	**Softlab Inc.+**	100.2	86.7	15.6%	28.0	25.1	N/A	860
8	**Micro Focus Group PLC ^**	97.0	78.5	23.6%	N/A	N/A	4.7	546
9	**Lucas Management Systems**	88.0	84.0	4.8%	22.0	18.0	N/A	650
10	**International Business Systems**	87.2	90.6	-3.8%	N/A	7.4	0.5	1,055

All revenue figures are in $ millions for the calendar year 1991.
* Restated figure ** DATAMATION estimate
^ Year ending 1/31/92 ^^ Year ending 11/30/91 + Privately held
Sources: DATAMATION 100, company reports

Illustration by Ken Barr

KEN BARR

And know what? In a whole lot of cases, the Merlins of MIS *are* magically transforming the way their companies do business—with more than a little help from the quest masters in the software industry.

Just a sampling of the magic they've been working: used-to-be mainframe systems downsized to run as client/server; fresh and elegant GUI-based operating systems like Windows and OS/2; and new efficient, easy to use database management systems and data access techniques.

Of course, all this new software *does* cost money. So, even though many corporate IS shops were pressured by cost-conscious managers to delay or cancel new hardware purchases in 1991, that didn't stop them from spending big on the softside. In fact, market research firm Dataquest Inc. in San Jose reports that IS investment in software finally exceeds hardware spending.

FUTURE QUEST: MICROSOFT CORP.

Never accuse Microsoft Corp. of lacking the big perspective when it comes to defining a galactic role for itself in the future. Having helped spark the Big Bang of personal computing, it was perhaps only natural for it to turn to a young physicist—Nathan Myhrvold, who studied under famed cosmologist Stephen W. Hawking—to help chart a way through its expanding software universe. That course will lead Microsoft into new dimensions of software form and function, says Myhrvold, vice president of advanced technology and business development.

Two overriding trends will shape the software environment in which Microsoft will operate during the next five to 10 years, Myhrvold predicts. One is the combined increase in the power of microprocessors and constant decrease in their size and cost. Within five years, 1,000-Specmark processors will be common, he says, leading to an inevitable conclusion: "The notion of computational power as something that has to be centralized is completely wrong."

The spread of powerful but small computing devices will drive the second trend, that of gigabit-per-second fiber optic networks, to every business and home. To hear him tell it, "Networking will become enormously important because we'll have zillions of these processors around," and they'll need to communicate.

Out of these two trends will come a technological synergy that will make telecommuting a much easier and more natural way of performing business tasks. Microsoft hopes to help provide the requisite software support that will allow people "to work remotely, but with the same effectiveness that you would have in the office," Myhrvold says.

With its pervasive Windows environment, Microsoft thinks it has a vehicle that can carry it into the foreseeable future. By making Windows flexible enough to support future requirements such as 64-bit computing and symmetric multi-processing, "We've tried to create an architecture that can live over time."

While shying away from the notion of "expert" systems that completely replace people, the company also sees a coming role for artificial intelligence-based (AI) "agents or assistants."

As part of the company's move to AI, Myhrvold's developers are working on natural language processing to help simplify database queries as well as to assess the content and importance of text such as news articles and electronic mail messages. They are also working on simple inference tools that may be able to perform enough "reasoning" to handle such tasks as handwriting and speech recognition.

In pursuing these software goals and others, Myhrvold oversees Microsoft's business relationships with strategic partners. He also directs about 50 people doing advanced research, which is "projects that are challenging and risky, but which we do intend to become products." Myhrvold manages a research lab—the first ever formed by a software company, he claims. Hardware-oriented firms and universities that have done the bulk of software research up to now haven't always been able to capitalize on their work, he notes. Microsoft intends to do better.

In the research lab, unlike the advanced development group, "you try to do things that you're not sure are possible," Myhrvold explains. There would be no point to his group if it was overly conservative in its aspirations, he says. "With new technology projects, if you don't fail on some of them, you probably weren't pushing very hard." —*Dwight B. Davis*

"Because of the recent economic recession, management has looked at reengineering processes, putting in place new applications—new software—to save money," says Vaughan Merlyn, resident software guru at Boston-based IT consultants Ernst & Young.

New software technologies can't really convert base metal into gold—or into any other metal for that matter. But it can generate efficiencies that turn into dollars saved. Says Todd Templeton, lead systems analyst at Phelps Dodge Corp., "You can't make more copper with software, no matter how sophisticated it gets. But the software lets us process more copper with fewer people—the new applications do make us more efficient."

Templeton says the Phoenix-based copper mining and refining company is now doing more with fewer resources since it began using the entire function server line of products from Software AG to transform its IS systems into new client/server applications. The new applications tie end users on DOS, OS/2 and UNIX workstations into existing mainframe-based Adabas databases, replacing terminal-based systems previously on users' desks.

Each of the leading software vendors on Datamation's list of the Big 50 has its own special magic formula aimed at giving the vendor in question the place of honor on user's desktops at minimum, and on their LANs and mainframes as well.

Redmond, Wash.-based Microsoft was the most powerful of the software sorcerers in 1991, thanks to a whole slew of new DOS/Intel based products—the new DOS 5.0, Windows 3.1, Project For Windows, Excel 4.0 spreadsheet and Word 2.0, new development tools for Windows like C/C++ 7.0, Quick C For Windows, Visual Basic, a Multimedia Developers Kit, and the list just keeps running. Sales soared nearly 54% in 1991, making the company the first $2 billion software vendor in history.

And others cashed in on Microsoft's magic. Cupertino, Calif.-based Symantec Corp. capitalized on Windows 3.1's modest file management features by releasing version 2.0 of the Norton Desktop For Windows, a Windows shell that includes many features of Norton Utilities. The result? Symantec's sales shot up more than 69% over 1990 to top $210 million.

Other leading software vendors like Orem, Utah-based WordPerfect Corp., Lotus Development Corp. of Cambridge, Mass., Borland International Inc. of Scotts Valley, Calif., and even Islandia, N.Y.-based Computer Associates International Inc. all rolled out new Windows-based spreadsheet, database and word processing applications in 1991—and users quickly snatched them up.

FUTURE QUEST: LEGENT CORP.

Mainframe systems management vendor Legent Corp. sees the future and, to paraphrase Pogo, it is us—us end users, that is. And they've set a clear course for the company to build mainframe-class support into the fast-arriving world of end-user controlled distributed computing.

The new technologies the company is building, says product development vice president Bob Yellin, will leave the datacenter out of the loop and give PC and LAN-based end users the same kinds of automated support services Legent builds for mainframe managers.

Legent is hard at work building a suite of systems software that will function as "an interface point, a very crucial interface, between the data center and the end user," says Yellin.

Some of the critical automated services Legent aims to give end users: software distribution, license management and billing/chargeback services—all of which would operate across a client/server environment withheterogeneous servers.

LEGENT

Legent has been touting its emerging systems management architecture, the goal of which is to build a group of service sets that can share resources and operate like a single package.

"It's all related," explains Yellin. "You have an inventory and asset management area. . . and you have a software distribution system which accesses that inventory and asset database to figure out who is an existing user of something and who needs to be upgraded. And then you have the network license management server, which also needs to interact with the database in order to feed billing and chargeback operations, and to predict rates of growth of software use within the company."

But despite its push into automating distributed systems management, Yellin says Legent has no plans to abandon its bread-and-butter data center management business.

Legent was born of a merger, and has continued to grow its technology through mergers over the last three years. In fact, the company's most recent mergers show Legent laying the technological groundwork for the products Yellin presages: Legent picked up software distribution and file transfer technology when it purchased New York City-based Spectrum Concepts Inc. last January, and it won output distribution technology in merging with Columbus, Ohio-based Goal Systems International Inc. in a deal that closed last summer.

Molding such products into Yellin's vision of computing's future will require rebuilding them into object-oriented, client/server versions in which both the client and the server components are portable across multiple platforms, he says. An example of just such a technology: Legent's Endevor Workstation, a software management tool. A rewrite of mainframe-based Endevor/MVS (which was acquired, along with Yellin, when Legent bought Business Software Technology in 1989), the workstation product includes a C language-based kernel supported by separate shells for DOS, Windows and OS/2 built using the object oriented C++ language. —*Ned Snell*

FUTURE QUEST: BOOLE & BABBAGE INC.

Boole & Babbage wants to be known as the enterprise automation company of tomorrow. The vendor that introduced the first IBM mainframe performance monitor in 1967 sees a future of automated systems and network management products working across the spectrum of computing platforms.

At the heart of Boole's plan for the future is an underlying technology called Boole & Babbage Intercommunication Facility Level 3 (BBI-3). Structured on a client/server model, BBI-3 provides a common set of communications, data and user interface services for products based on MainView, Boole & Babbage's architecture for integrating its systems performance monitors, automated operators and analysis tools.

Boole & Babbage

Boole has already rolled out one new product based on the latest release of BBI-3—a performance monitor called MV Manager for MVS—and is set to release two more by the end of the year. Beyond that, Boole expects to spend the next few years adapting most of its current products to the new technology.

Olivier Thierry, Boole's director of marketing and business development, says BBI-3 was specifically designed for managing the IS environment of the coming decade—with a growing emphasis on maintaining service levels for business applications that execute across a variety of distributed computing environments and platforms. "The end user wants service," Thierry says, "and he doesn't care whether his application is on MVS, CICS or DB2."

MV Manager for MVS is a good example of the concept in action. Whereas traditional performance monitors typically track specific system resources, MV Manager for MVS lets users track the performance of applications by creating customized views of workloads across system resources, across subsystems, even across multiple systems and processors.

For now, BBI-3 is a technology confined to the MVS mainframe world. But Thierry, says Boole, plans to work diligently to expand BBI-3's horizons.

Development, for example, of Net/Avail, a new Systems Network Architecture (SNA) network node availability product that's due for release later this year, required Boole to extend BBI-3's global data model and to build data collectors into SNA.

Also, BBI-3's DataBus will probably be extended to bring in data from Boole's Unix-based network management system, Net/Command. And Net/Command itself will be enhanced with Auto/Command, a product due to ship by the end of the year that will bring to Net/Command some of the same automation capabilities that Boole's AutoOperator provides on the host.

—Mark Taber

boosting what might have otherwise been lackluster sales figures for some of these companies.

But that's not to say the magic is fading from the masters of the mainframe and midrange software industry. In fact, many users, faced with inefficient, expensive and complex mainframe systems decided to hold off buying more hardware and have boosted their spending on a new generation of innovative mainframe systems software tools instead—subsystem monitors, DB2 tools and change management applications—to help them boost efficiency and rein in data center costs.

Six mainframe system software vendors—BMC Software Inc. of Sugar Land Texas; Los Angeles based-Candle Corp.; Compuware Corp. of Farmington Hills, Mich.; Goal Systems International Inc. of Columbus, Ohio; Vienna, Va.-based Legent Corp.; and Systems Center Inc. of Reston, Va.—all reported double-digit revenue growth for 1991, thanks to some impressive product innovations. BMC, recognized by many industry followers to be a leading techno wizard among big iron system software vendors—posted 1991 revenues of $174 million, a 49% jump over 1990.

Users continue to look for ways to offload corporate processing from their megabuck mainframes to less costly PCs and workstations.

But judging by the revenue numbers, users are not just offloading portions of applications from the mainframe, they're also downsizing entire database management systems. Relational database management system (RDBMS) vendors Oracle Corp. of Redwood Shores, Calif., Informix Software Inc. of Menlo Park, Calif., the Ingres division of ASK Computer Systems Inc. in Mountain View, Calif., and Sybase Inc. of Emeryville, Calif., report big jumps in sales of RDBMSs on UNIX. And Walldorf, Germany-based software vendor SAP AG is even betting the farm on UNIX by offering the next generation of its massive mainframe application and database system, called R/3, on UNIX only.

CA also took the leap into UNIX last year with its mainframe software; the firm announced its own UNIX RDBMS, CA/DB, and partnered with Hewlett Packard Co. of Palo Alto, to eventually develop all its software products for HP's UNIX platforms.

Sybase and Informix were the high flyers of the RDBMSs in 1991, reporting revenue gains of 55% and 23%, respectively. Oracle's UNIX revenue gains were tempered by a dip in mainframe RDBMS sales, to bring its annual gain to mere mortal 8%. But, overall revenue was still good enough for third place in the Big 50.

Even the Computer Aided Software Engineering (CASE) business, noted more for its technical wizardry than its sales prowess of recent years, seems to finally be building steam. CASE vendor KnowledgeWare Corp. of Atlanta, reported that

FUTURE QUEST: INTERLEAF INC.

For Interleaf, document preparation in the future will be a whole lot more than just plain ole' desktop publishing. Electronic preparation, yes, but also cross-platform electronic distribution and management of "documents" of all types.

And under Interleaf's schema, most of these documents will never see the white of paper. Instead, they will live and die electronically on databases of various shapes and types. Think of all those trees Interleaf is saving.

In the Interleaf view, documents are the medium for all corporate communications. Databases, on the other hand, are the medium for archiving structured data. To bring the two together, Interleaf provides a dynamic link between the document and the database or other applications. This link can be used to build complex, highly automated, integrated applications.

The Interleaf document environment spans a variety of Unix and Digital platforms, and will soon support most of the leading graphical user interfaces. "Our goal is to support the four main graphical interfaces; Open Look, Motif, Windows NT, and the Macintosh," says Philip London, senior vice president, engineering and chief technical officer. The firm recently released a beta version of Interleaf 5 for Open Look; a Windows NT version is under development.

Interleaf 5 is the company's core publishing product for document creation and composition. The company has packed it with advanced technologies such as object-oriented (OO) capabilities. Interleaf architected its object technology to allow users to get at it directly through the user interface. "Objects don't provide value unless the user can work with the objects without programming," says London. With Interleaf, every element of the document is defined as part of a class of objects. By manipulating objects and classes, users can control every aspect of the electronic document.

The firm's other major products increase the users' power to manage and distribute electronic documents, whether they end up on paper or not. The Relational Document Manager allows users to manage the creation of complex documents through revision control, access control and workflow management capabilities. And Interleaf's innovative new WorldView product can bring a wide range of document and image types together into a single WSYWIG view and cross reference to other documents on the system at will.

It's no surprise that Interleaf supports a document-centric view of the future. "The vast majority of corporate information takes the form of human-readable documents," says London. "Most people spend their day reading and writing memos, reports, proposals, and other documents, not retrieving data from a database."

—Alan Radding

revenue jumped more than 89% in 1991 to top $125 million. And Bachman Information Systems Inc. of Burlington, Mass., although not yet a member of the Big 50, saw sales grow a whopping 80% in 1991 to $39 million.

Larry McCoy saw the magic in Bachman's CASE tools. The vice president of joint product development at HBO & Co., an Atlanta-based systems integrator for the health care industry, began using a CASE tool set from Bachman to build core systems that can be easily modified from installation to installation.

McCoy says that despite tighter budgets this year, he went ahead and invested in the Bachman toolset because he believes HBO can reduce development time and costs using the tools to build core systems only once for all HBO's customers' platforms. Then, using the Bachman tool, McCoy targets the code to each platform, whether it be an IBM mainframe, a Digital Equipment Corp., or a Data General Corp. minicomputer.

"Bachman's CASE tools give us better quality applications, lower development costs and better documentation," says McCoy.

McCoy's comment may explain the amazing success of the software industry in general. New applications released by software vendors are of better quality than in the past, they can run on less costly and more powerful hardware than ever before, and, properly implemented, these applications are helping speed up time to market for new products and services.

Says Mike Seely, a software market analyst at Dataquest, "As users see what software can do for them, it's becoming more essential. It's not a luxury anymore, it's a necessity. And as that happens, it opens the door for more sophisticated applications to make their way into IS shops."

These include systems based on emerging technologies like object-oriented databases and applications, distributed databases, client/server and distributed computing systems, even office automation groupware.

Adds Seely, "In another five years it will be impossible to think that a business could run without these kinds of software tools."

The real trick for the software industry is to find a way to transform the new complexities of computing into the much sought after functional environments users expect to confront when they sit down at a workstation. Call it Windows, call it OS/2, call it UNIX—it all boils down to easy to use complex systems. The software industry's challenge is to keep advancing the technology while simplifying the product, says Seely. "That's why I think we will see double-digit growth for the foreseeable future in the software business," he adds. "It should be exciting." ■

—Research by Susan Mael

Banking Will Buy Again

The high volume of transactions in the finance and banking industry continue to make it a prime candidate for the adoption of information technology products. The automation of tasks over the last decade has sped up productivity. According to the U.S. Department of Labor, output per hour in the commercial banking industry rose from 97.3 in 1981 to a peak of 129.1 in 1988.

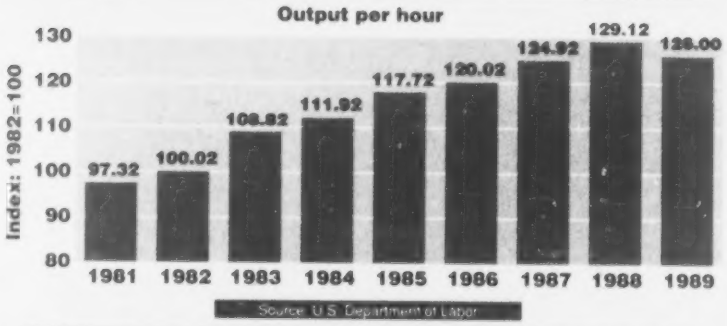
But the recent recession—and the real estate bust in particular—was anything but kind to the banking industry. Bank failures, consolidations and red ink forced delays in IT purchases last year.

Banks should be spending more on IT in the future, according to a survey of data communication managers and executives in the banking industry conducted by Williams & Associates of Salem, Mass., and Racal Corp. of New York City. Of the DP managers polled, six out of 10 believed budgets would increase by a mean of 13% this year. Nearly half of the executives anticipated a mean budget gain of 10%.

Both groups look for steady average annual increases of 10 to 17% in IT spending over the next five years. The big need, according to the respondents, is networking equipment and software to link together in-place hardware. The importance of networked systems is heightened by the continuing consolidation in the industry and the emergence of super-regional banks that mandate connecting regional offices. Furthermore, the steady erosion of regulations, which separate banking and securities practices, is creating new market opportunities for banking automation software vendors. ■

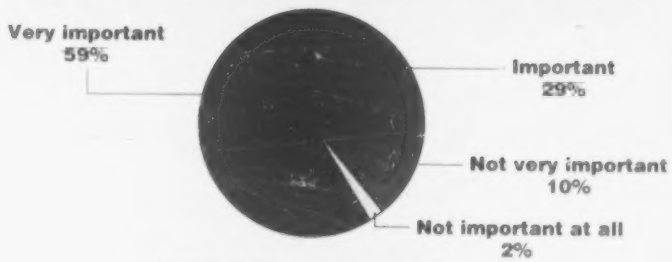
By Madeline Franchi. For more information on Cahners Economics's forecasting services, call Dan Buchan at (617)-630-2105.

IT Accounts For Bank Productivity



Source: U.S. Department of Labor

Banks Rate The Importance Of Networks



Source: Williams & Associates, Racal Corp.

The Economy At A Glance

U.S. Economy: Macroeconomic And Industrial Indicators

	Actual			Forecast	
	Q4/91	Q1/92	1992	1993	1994
Gross Domestic Product	0.4	2.7	2.1	2.6	2.0
Business Investment In Equipment	-1.6	3.5	2.1	4.6	4.2
Government Spending	-5.4	2.9	-2.3	-3.7	-0.1
Consumer Spending	0.0	5.0	2.6	2.8	1.9
Exports	9.7	2.5	5.9	7.5	6.5
Imports	2.1	1.5	4.8	3.5	3.2

All calculations are % change in 1987 dollars, quarterly figures are seasonally adjusted annual rates

	May 1992	April 1992	% Change 5/92-4/92	May 1991	% Change 1991-1992
Manufacturing Production (1)					
Process Industries Total	109.6	109.5	0.1	104.4	4.9
Chemicals	115.6	115.3	0.3	109.2	5.9
Petroleum	110.0	110.4	-0.4	107.5	2.3
OEM Total	111.2	109.6	1.5	109.3	1.8
Computers & Peripherals	170.0	168.2	1.1	155.6	9.3
Communication Equipment	111.3	111.0	0.3	113.0	-1.5
Transportation Equipment	99.8	98.0	1.8	98.2	1.6
Services Employment (2)					
Finance, Insurance, Real Estate	6.688	6.654	0.5	6.681	0.1
Health Care	8.414	8.394	0.2	8.109	3.8
Computer & Data Processing	.809	.811	-0.3	.786	2.9
Transportation/Utilities	5.744	5.705	0.7	5.767	-0.4
Retail Trade	19.118	18.909	1.1	19.258	-0.7
Wholesale Trade	5.990	5.968	0.4	6.079	-1.5
Government	18.937	18.899	0.2	18.752	1.0

(1) Index 1987 = 100, seasonally adjusted
(2) Millions of persons, not seasonally adjusted

Source: Commerce Dept., Cahners Economics

SALES OFFICES

U.S. AND INTERNATIONAL

Publisher/Vice President
Mike Wisner
Sales Manager
Stephen Twombly
Assistant to the Publisher
Cathy McCormick
Sales Manager
Kelly Mount
Production Supervisor
Laurie Eleuteri
Production Manager
Dian S. Tobin
Advertising Services
Kelli Ann Haugh

EASTERN REGION

MID-ATLANTIC
Rick Groves
487 Devon Park Drive
Suite 206
Wayne, PA 19087
(215) 293-1212

NEW ENGLAND/CANADA
Alan Bergstein
199 Wells Avenue
Newton, MA 02159
(617) 964-3730

MID-ATLANTIC
Kathy A. Murray Powers
103 Eisenhower Parkway
Roseland, NJ 07068
(201) 228-8617

MIDWEST
John Stellwagen
1350 E. Touhy Avenue
Des Plaines, IL 60018
(708) 390-2982

SOUTHEAST
Peter Nicas
6520 Powers Ferry Road
Suite 395
Atlanta, GA 30339
(404) 955-5500

WESTERN REGION

NORTHERN CALIFORNIA
Tina Ferguson
3031 Tisch Way
Suite 100
San Jose, CA 95128
(408) 243-8838

NORTHWEST
Carole Sacino
3031 Tisch Way
Suite 100
San Jose, CA 95128
(408) 243-8838

SOUTHWEST
Terry Buckley
1904 Church Street
Suite A
Costa Mesa, CA 92627
(714) 722-1242

John Sabo
447 Herondo Street
Suite 305
Hermosa Beach, CA 90254
(310) 379-8455

INTERNATIONAL

CANNERS PUBLISHING COMPANY
27 Paul Street
London EC2A 4JU
England
Tel: 44 71 628 7030
Telex: 914911 CAHNERS G
Fax: 44 71 628 5984
Managing Director - Europe
Tully Giacomazzi

FRANCE
Laura Whiteman
Canners Publishing Ltd.
14 Rue Des Parcelles
92600 Asnieres Sur Seine
France
Tel: 33 1 4790 0507
Fax: 33 1 4790 0643

SPAIN
Carlos Perez
Managing Director
Haymarket S.A.
Arribau 168-170
1 Planta
08036 Barcelona
Tel: 343 238 1742
Fax: 343 237 6688

GERMANY/AUSTRIA
Erhardt Eisenacher
Canners Publishing Ltd.
Markt 9
D-5300 Bonn
Tel: 49 228 650013
Fax: 49 228 650076

SWITZERLAND
Werner Stahli
Schieberacker Strasse 14
CH-8245 Feuerthalen
Switzerland
Tel: 41 53 29 2087
Fax: 41 53 29 2034

ISRAEL
Asa Talbar
Talbar Media
PO Box 22917
Tel Aviv 61228
Israel
Tel: 972 332 2716
Fax: 972 22 4 7 403

JAPAN
Kaoru Hara
Dynaco Int'l Inc.
Suite 1003 Sun Palace
Shinjuku
8 12 1 Nishishinjuku
Shinjuku Ku
Tokyo 160 Japan
Tel: 81 3 3366 8301

TAIWAN
Parson Lee
Acteam Int'l Marketing Corp.
2 Sois No. 17 Alley 7
Lane 217 Sec. 3
Chung Hsiao E. Road
PO Box 18-91
Taipei, Taiwan, ROC
Tel: (866) 2 7114833

SINGAPORE
Peter Cheong
Asia Pacific Media House PTE Ltd.
Newline 100 Beach Road
#24-03 Shaw Tower
Singapore 0718

DATAMATION CAREER OPPORTUNITIES

Roberta Renard
National Sales Manager
103 Eisenhower Parkway
Roseland, NJ 07068
(201) 228-8602

Janet O. Penn
Eastern Sales Manager
103 Eisenhower Parkway
Roseland, NJ 07068
(201) 228-8610

Diane Philipbar
Production Assistant
(201) 228-8608
103 Eisenhower Parkway
Roseland, NJ 07068

INFORMATION CARD DECKS

Diane Berger
275 Washington Street
Newton, MA 02158
(617) 558-4355

INSIDE SALES

Judy Benford
275 Washington Street
Newton, MA 02158
(617) 630-3937

Michael Paul
275 Washington Street
Newton, MA 02158
(617) 630-3943

ADVERTISING INDEX

ADVERTISERS IN THIS ISSUE

This index lists advertisers in this issue of DATAMATION

	Page	Circle
Ampex Corporation	6-7	6
Answer Computer	35	18
AT&T	25-27	—
Attachmate	85	35
Bachman Information Systems	8	7
BMC Software Inc.	37	19
CF Software**	117	41
Chipcom	67	28
Cincom	15, 95	11, 39
Computer Associates	13	9
Exabyte Corp.	65	27
Executive Software	112A-B	—
Fischer International	62	26
Genicom	22	14
Grafpoint	34	16
Hewlett-Packard	90-91	—
IBM Corp.	16-17, 102-103	—
ICCP	14	10
IDEAssociates	47-49	21, 22
Info Tech	88	37
Integris	C4	2
Intersolv	21	13
LEGENT CORP.	10-11	8
LXE	57, 80-1, 80-4	24, 100
Maxell	72	31
Motorola	4, 86-87	5, 36
Multiverse Communications**	117	42
NCR Corp.	52-53	23
Network Systems	60-61	25
Northern Telecom	76-77	32
Oracle Corp.	2	4
Platinum Technology	70-71	30
Popkin Software	78	33
Progress Software	82	34
Quarterdeck	1	3
SAS Institute Inc.	C2, 59, 104	—
Siemens Nixdorf	96-1, 96-16	—
SMAU	92	38
Software AG	33	15
Software Maintenance & Development	36	17
Software Quality Automation	C3	1
Sterling Software	101	40
System Software Assoc. Inc.	45	20
Unisys Corp.	38-39	—
Verbatim Corp.	69	29
Xerox Corp.	18	12
Recruitment Advertising 118-124		—
American Institute for Computer Sciences		
American Software		
Atlanta High Tech Career Fair		
Carolina Power & Light Co.		
Coca-Cola USA		
Computer Task Group		
Computer People Unlimited		
Comsys Technical Services		
CPI, Inc.		
Eli Lilly & Company		
Interactive Business Systems		
International Computer Professional Association		
National Computer Systems		
Response Technologies Corp.		
Sales Technologies		

**Product/Services Mart

Headquarters: 275 Washington St., Newton, MA 02158 (617) 964-3030, telex 127703, fax (617) 558-4506. **Central:** Two Forest Plaza, 12201 Merit Dr., #730, Dallas, TX 75251, (214) 419-1820. **Western:** 12233 W. Olympic, Los Angeles, CA 90064, (213) 826-5818, 3031 Tisch Way, Suite 100, San Jose, CA 95128, (408) 243-8838. **International:** 27 Paul St., London EC2A 4JU, England, (44 1) 628 7030, telex 914911. DATAMATION® (ISSN 0011-6963, RPUSA GST #123397457) Magazine is issued twice monthly on the 1st and 15th of every month with an additional issue in April by Cahners Publishing Associates, L.P., 275 Washington St., Newton, MA 02158. Editorial and advertising offices: 275 Washington St., Newton, MA 02158. Annual subscription rates: U.S. and possessions, $69; Canada, $98; Japan, Australia, New Zealand, $180 air freight; $290 air mail; Europe $157 air freight; $290 air mail. All other nations, $157 surface, $290 air mail. Reduced rate for U.S. public and school libraries, $47. Single copy, $10 in U.S. **For Foreign Subscribers only:** send all address changes and correspondence to: DATAMATION, Cahners Publishing Netherlands, Postbus 9000, 2130 DB Hoofddorp, The Netherlands, FAX # + 31 20 6531316, tel # + 31 20 6531171. Circulation records are maintained at 44 Cook St., Denver, CO 80206. Phone (303) 388-4511. Second class postage paid at Denver, CO 80206 and at additional mailing offices. DATAMATION® copyright 1992 by Cahners Publishing Associates, L.P. Reprints of articles are available; contact Andrea Marwitz (708) 635-8800. Microfilm copies of DATAMATION® may be obtained from University Microfilms, a Xerox Company, 300 N. Zeeb Rd., Ann Arbor, MI 48106. Printed by Griffith Press, Inc. **All inquiries and requests for change of address should be accompanied by mailing label from latest issue of magazine.** Allow two months for change to be made. **POSTMASTER: send address changes to DATAMATION®, PO Box 173377, Denver, CO 80217-3377.**